



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

PUBLIC HEALTH REPORTS

VOL. 33

DECEMBER 27, 1918

No. 52

EPIDEMIC INFLUENZA.

PREVALENCE IN THE UNITED STATES.

On page 2329 of this issue of the Public Health Reports, under the heading "Current State Summaries," are given telegraphic reports of the presence of communicable diseases in the States which have reported for the week ended December 21, 1918.

In most of the States the number of cases of influenza is less than was reported for the preceding week, but slight increases are noted in Michigan, New Jersey, Maine, and in parts of New York State.

The reports from the zones around military camps, which are given on page 2334, also show a reduction in the number of cases as compared with the preceding week, except in the zones around Camp Devens, Mass., Camp Dix, N. J., Camp Doniphan, Okla., Camp Humphries, Va., Camp Lewis, Wash., Fort Oglethorpe, Ga., and in the civil sanitary districts near New London, Conn., Portsmouth, N. H., Kittery, Me., Newport News, Va., and Gulfport, Miss. In these zones slight increases in the number of cases reported are noted.

PRELIMINARY STATISTICS OF THE INFLUENZA EPIDEMIC.¹

By EDGAR SYDENSTRICKER, Public Health Statistician, United States Public Health Service.

It must be obvious that it is too soon to attempt any satisfactory presentation of the statistics of the present influenza epidemic for the country as a whole. The epidemic and its immediate after effects are not yet ended. Sufficient opportunity has not been afforded for proper inquiry into the dates of its first manifestations in various localities. Its complete chronology, therefore, can not be recorded at this time. For the same reason statistics of its incidence and prevalence are not only incomplete, but the task of collecting such records as have been made is barely under way.

If time and labor were the only requisites for complete statistics of the epidemic, however, the outlook from the point of view of statistical analysis would be an encouraging one. So far as morbidity prevalence and incidence of the disease are concerned, the

¹ Read before the section on vital statistics of the American Public Health Association, Chicago, December 9, 1918.

outlook is anything but encouraging. Were there any necessity for demonstrating the utter inadequacy and lack of uniformity of morbidity reporting in the United States, such a demonstration would be fully available in the experience afforded during the present epidemic. The shortcomings of morbidity statistics already are so well known that it is unnecessary to refer to them in detail. Their chief fault—incompleteness—was immeasurably increased by the unusual circumstances that prevailed. Among these circumstances were the magnitude of the epidemic in a large number of localities, the congestion of cases at and near the peak of the epidemic, the tendency to cease reporting toward the end of the epidemic, the breakdown of the more or less elaborate system of individual card reports which called for unessential as well as essential data, and the depletion of the reporting personnel—the practicing physicians—by service in the armed forces and by the disease itself. In addition to these unusual conditions was the fact that in practically no State or locality had influenza been a reportable disease prior to the 1918 epidemic, and that in perhaps a very large proportion of localities it was not made a reportable disease until the epidemic was well under way.

In studying the prevalence of influenza, therefore, we are confronted with serious obstacles, among which may be mentioned the following: (1) In practically no locality can it be assumed that complete reports of cases were made; a true prevalence rate can not be computed. (2) Since the disease was not reported with any degree of comparable completeness in different localities, comparisons of localities for prevalence obviously are impossible. (3) For the same reasons, statements of the incidence according to sex, age, or of any other condition with which it might be desirable to attempt correlations are not feasible, except in very general terms. (4) The chronology of the epidemic in perhaps the great majority of localities has not been recorded, and if recorded is subject to serious errors with respect to the beginning of the epidemic and the true height of the peak. (5) Fatality rates manifestly can not be ascertained. With the exception of data obtained from special field studies and from limited areas and population groups, we must look to mortality reports for our main statistics of the epidemic.

THE COLLECTION OF STATISTICS OF THE EPIDEMIC.

It may be of interest, and it is properly pertinent as an introduction to the few general observations that follow in this brief comment, to state in a few words what the Public Health Service did and is now doing to obtain reports of morbidity and immediate reports of mortality from influenza. For some time a standing direction and request to field officers and collaborating epidemiologists of the

Public Health Service in various States and State health officials has been that any unusual appearance of a disease be reported by telegraph to the Bureau of the Public Health Service, in Washington. In addition to this, weekly and monthly reports of the prevalence of certain diseases are received from States and a large number of cities. Although influenza was not on the list of reportable diseases, many localities included it in the list soon after it became epidemic. The reported presence of an influenza epidemic in Europe caused the regular reports to be scanned with more than ordinary interest, and special directions were sent to various field officers and hospitals of the service to report any appearance of the disease or of an influenzalike disease. On September 18 telegrams were sent to all State health officers to wire information concerning the appearance and prevalence of the disease and to keep the Public Health Service constantly advised as to its manifestations within their States. In response to these directions and requests information, principally of a summarized nature, came daily. When the epidemic, soon after the 1st of October, apparently was reaching serious proportions telegrams were sent to all State health officers requesting daily telegrams as to the number of deaths occurring in all the principal cities. This telegram was shortly supplemented by further telegrams assuming the cost of telegrams from local health departments to the State health departments as well as the cost of messages from the State health departments to the Bureau of the Public Health Service at Washington. These telegrams were continued for over three weeks when, because of the evident decline of the epidemic in the country as a whole and because of the heavy cost of telegraphic reports, they were discontinued, except for localities where the epidemic had not passed its peak. Daily summary statements from State health departments were continued, however, as long as it appeared necessary in addition to the usual notification by wire and by mail of disease prevalence.

The data thus obtained served principally as an indication of the prevalence of the epidemic and did not afford complete enough statistics for analysis from any point of view, either for deaths or for cases, except for a comparatively small number of localities. Information of varying degrees of accuracy and completeness was received from several thousand localities, and has already been summarized in what appeared to be the most practicable form in the Public Health Reports. In order to supplement these data requests accompanied with blank forms were sent to all local health subdivisions of the United States through the cooperation of State health departments asking for the following information: (1) Number of cases of influenza reported by days; (2) number of deaths reported by date of death (if possible), or by days on which they were re-

ported, from influenza and from pneumonia; (3) a statement as to whether or not the case reports show date of onset and sex and age of person affected and the date on which influenza was made a reportable disease. These reports are being collected now. It is hoped to obtain from these inquiries as complete chronological data as have been actually recorded in various localities and to ascertain in what localities the data may lend themselves to more detailed inquiry and analysis.

For the purpose of securing certain further data as to chronology, actual prevalence and sex and age incidence, mortality and fatality, as well as for the purpose of analysis from other points of view (such as congestion in homes, duration and severity and type of attack, economic conditions, and the like), certain field studies have been undertaken in Baltimore and in other urban and rural areas in Maryland, and in several localities in other States which are believed to be representative of various sections of the country. These studies are being made by house-to-house canvasses of various areas, the census of the population visited being in all cases ascertained. Steps have also been taken to cooperate with the Federal Bureau of the Census and various State and other agencies for the tabulation of certain mortality and morbidity records for the purpose of rendering available at the earliest possible date a sufficient amount of data for epidemiological and analytical study.

SOME PRELIMINARY STATISTICS.

In the following comment upon such fragmentary statistics as are available at this writing, no attempt has been made to suggest any conclusions except in a most tentative way. With the limitations of the data in mind, a preliminary presentation of the following is made:

1. The movement chronologically of the epidemic in the United States as suggested by reports from about 375 localities.
2. An estimate of the total mortality so far experienced.
3. A consideration of the mortality rate from the epidemic in nearly 120 cities and towns from the points of view of their size and their geographical location and of the chronological order in which their death rate was first affected by the epidemic.
4. The course of the epidemic (or type of epidemic curve) in various localities in relation to the size of the locality and in relation to the occurrence of a secondary epidemic or "recrudescence."
5. The incidence of cases and of deaths according to age in certain areas in Baltimore selected at random in a field study.
6. The chronological relation of the onset of influenza cases of more or less severe types to onset of cases of pneumonia and to mortality from influenza and pneumonia in the areas canvassed in Baltimore.

7. Variations in incidence among areas canvassed in Baltimore.

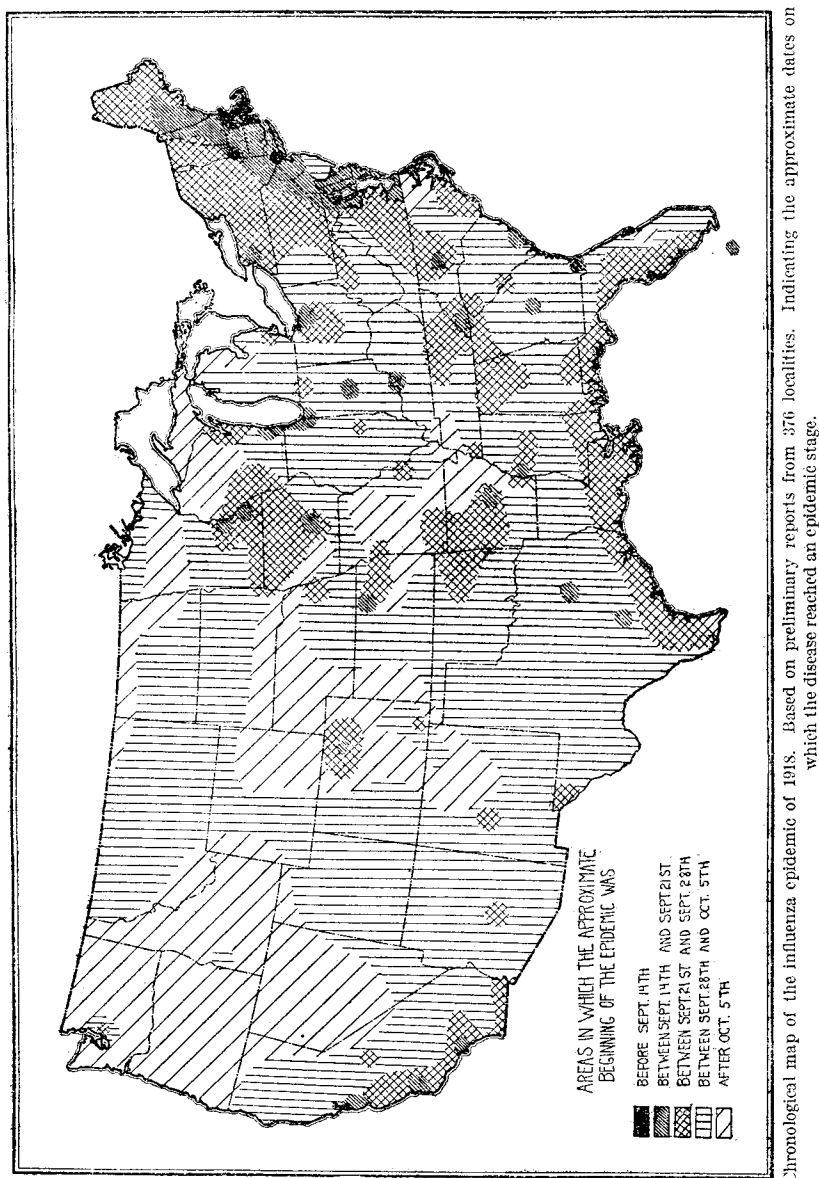
Pathometrical analyses have not been attempted for the obvious reason that the data at present available are not accurate or complete enough for anything more than very general consideration. For the same reason it has not been deemed advisable at this time to attempt any correlation of the types of epidemic curves in various localities with facts concerning the previous prevalence of respiratory or other diseases or with methods employed in attempts to control the epidemic or to mitigate its effects.

The Movement of the Epidemic.

In figure 1 an attempt has been made to indicate the chronological order in which certain localities and areas, for which information is available at this time, were attacked by the epidemic. In Table 1 these localities have been classified according to geographic divisions of the United States. It should be borne in mind that more complete and accurate information probably will modify these indications as well as supply greater detail. The map is based upon information relating to the approximate date on which the disease reached an epidemic stage in 376 localities. For convenience, these dates have been grouped into calendar weeks. The localities are fairly well distributed through the country, density of population considered. The localities with their respective dates were first spotted on an outline map of the United States and lines were drawn inclosing the areas in which the epidemic apparently reached an epidemic state in similar calendar weeks. The absence of data for many localities at this writing probably causes the map to be lacking in important details, especially with respect to centers and surrounding localities constituting areas in which radial movements of the epidemic might have occurred.

These data suggest that the first area to be affected by the epidemic was the eastern part of Massachusetts and two or three other points near the north Atlantic coast prior to September 14. It may be stated that the disease reached an epidemic stage in some of these localities a week or more earlier than September 7. During the week ending September 21 the disease appears to have reached an epidemic stage in a considerable area along the Atlantic coast from the southern part of Maine to Virginia, as well as in a number of localities well scattered over the entire country. During the week ending September 28 a number of areas adjacent to centers in which the epidemic had already appeared were affected, suggesting that there were radial movements from these centers, and epidemic proportions were attained in large portions of the New England States, the North Atlantic, the Central States, and in areas bordering along the Gulf

and Pacific coasts. During the week ending October 5, the epidemic apparently had appeared in points all over the country except in the more isolated rural sections and in large areas in the Central States,



in the Mountain States, and in the northwest section. By the middle of October reports from even these sections indicated that the disease had attained epidemic proportions in practically all of the remaining areas, except in the more isolated rural sections.

TABLE 1.—*Number and per cent of localities in each geographic division of the United States, classified by the weeks in which influenza was reported to have reached an epidemic stage.*¹

Geographic division.	Number of localities report- ing.	For week ending—								
		Sept.				Oct.				Nov. 2.
		7 ²	14	21	28	5	12	19	26	
Number.										
New England.....	40	4	7	18	11	5				
Middle Atlantic.....	23		1	8	9	5				
East North Central.....	34			4	7	19	3	1		
West North Central.....	58		1	4	7	27	13	2	4	
South Atlantic.....	49			9	17	12	2			
East South Central.....	33			2	16	19	1			
West South Central.....	39			3	11	21	3	1		
Mountain.....	59			1	6	27	16	5	3	1
Pacific.....	45			2	10	13	10	7	3	
Total.....	376	4	9	51	94	143	48	16	10	1
Percent.										
New England.....	100	10	17	45	28					
Middle Atlantic.....	100		4	35	39	22				
East North Central.....	100			12	21	56	9	3		
West North Central.....	100		2	7	12	47	22	3	7	
South Atlantic.....	100			23	42	39	5			
East South Central.....	100			5	42	50	3			
West South Central.....	100			8	28	54	8	3		
Mountain.....	100			2	10	46	27	8	5	2
Pacific.....	100			4	22	29	22	16	7	
Total.....	100	1	2	14	25	33	13	4	3	

¹ These reports are in many cases preliminary ones and are subject to correction. ² Prior to Sept. 7.

The outstanding fact, perhaps, is the extreme rapidity with which the epidemic spread after it attained the proportions of an epidemic in the first areas affected. The epidemic became nation-wide in four or five weeks after it appeared in an epidemic stage in the first localities affected. A fact of scarcely less importance is that the disease reached an epidemic stage in a number of localities in the central, northern, southern, and western sections at about the same time as it did in the area along the northeastern coast. The possibility is suggested, therefore, that sources of infection existed in at least some of the larger population centers, well distributed through the country, some time before the disease appeared as a nation-wide epidemic. The apparent radial spread of the epidemic from certain centers would seem to strengthen this hypothesis. It may also be noted that there is evidence, the collection of which has not yet been completed, pointing to the existence of cases of the disease in various centers, probably widely distributed, weeks before they were definitely recognized as influenza. The possibility that these foci themselves had a common focus is by no means excluded, of course, but there is as yet no conclusive evidence that would warrant the statement that the starting point of the epidemic was Boston or any specific locality.

Much interest has been attached to the belief that the Army camps acted as foci of the epidemic. It is true that a comparison of reports from Army camps and from the adjacent cantonment zones shows that in most instances the disease was reported in the camps first. This, however, by no means proves that the camps were affected earlier than the zones. The data from the two kinds of areas may not be comparable because of a possibly greater promptness in reports in the camps than in the zones, and it would be improper to draw any conclusions until the results of further inquiries are available.

Severity of the Epidemic.

It is too early to make more than a guess at the toll exacted by the epidemic in this country. Statistics have not been compiled for the normal rate of mortality from pneumonia or other respiratory diseases or from all causes except for a comparatively small number of localities, and until this is done it is manifestly impossible to ascertain how much mortality can be charged to the epidemic. The fact that in many localities there is appearing a recrudescence of influenza or influenza-like cases must also postpone any final estimate of mortality from the disease. Much needs to be known about the methods of diagnosis as well. A very general estimate of the minimum number of deaths chargeable to the epidemic perhaps may be attempted by ascertaining the mortality rate from influenza and pneumonia for various localities and areas of different types and geographical location. Such a rate, roughly computed for something over 27,000,000 population, after weighting areas according to geographic location, appears to be about 4 per 1,000 of population. Allowing, however, for the apparently lower rate in many rural sections, a conservative estimate for the country as a whole would appear to be between 3 and 3.5 per 1,000. Upon this basis, the total number of deaths chargeable to the epidemic in the country as a whole would be between 300,000 and 350,000. This estimate is confessedly rough and intentionally is made conservative. A much larger number of deaths is believed by some to have occurred already.

Comparisons of the Mortality Rates in a Number of Cities.

The results of some preliminary comparisons of the mortality rates for cities according to size, geographic location, chronological order in which they were attacked, and the occurrence of the so-called recrudescence, may be given in a tentative way. The information at hand is only approximately accurate except for a limited number of larger centers. Pending the collection and tabulation of more complete data, the basis for these comparisons is the death rate from influenza and pneumonia (all forms) during the six weeks of highest

mortality from these causes. This information is available at this writing for 118 cities, ranging in population from 10,000 to the largest population centers. Comparable data for rural areas are not yet available.

Extremely wide differences in these death rates are shown among these 118 cities, varying from 0.8 per 1,000 to more than 10 per 1,000. The largest variations were found among cities of less than 50,000 population; this, however, possibly is due in part to errors in the 1918 population estimates. But among the larger cities, wide variations in the death rates—from 1 to 8 per 1,000¹—are also indicated.

Mortality rates compared for localities of different size.—In Tables 2 and 3 the 118 localities are grouped according to size. The average mortality rate has been computed for various classes of localities (Table 2) and the distribution of localities within each population class according to mortality rate has been found (Table 3).

It appears quite evident that there is no well-defined relation between the mortality from the epidemic and the size of the locality.

Sufficiently wide differences in size among the smaller number of cities for which mortality data are furnished by the Federal Census Bureau permit a similar comparison. (See Table 4.) The mortality data for these cities are more complete, covering a period of 10 weeks (from Sept. 8 to Nov. 16, inclusive). They do not, however, suggest any definite relation between the mortality rate and the size of the city.

TABLE 2.—*Mortality death rate per 1,000 of population from influenza and pneumonia (all forms) during 6 epidemic weeks compared for groups of cities classified according to size.*²

Population class.	Number of cities reporting.	Total population of cities in each class.	Deaths from influenza and pneumonia (all forms) in 6 epidemic weeks.	
			Number.	Per 1,000 population.
Under 25,000.....	23	425,388	2,542	6.0
25,000 to 50,000.....	23	880,054	4,311	4.9
50,000 to 75,000.....	16	1,006,270	3,830	3.8
75,000 to 100,000.....	4	339,621	931	2.7
100,000 to 125,000.....	10	1,140,118	5,696	5.0
Under 125,000.....	76	3,791,451	17,270	4.6
125,000 to 250,000.....	16	2,758,926	8,966	3.3
250,000 to 375,000.....	9	2,595,047	5,966	2.3
375,000 to 500,000.....	8	3,419,342	12,211	3.6
Under 500,000.....	109	12,564,766	44,413	3.5
500,000 to 1,000,000.....	6	4,136,867	16,520	4.0
1,000,000 and over.....	3	9,573,931	39,902	4.2

¹ Similar statistics for between 40 and 50 cities, all of which had populations of more than 100,000, for the 10 weeks from September 8 to November 16, indicate variations from 1.5 to 7.3 per 1,000. See United States Census: Weekly Health Index for December 3, Summary Table for the Influenza Epidemic.

² As reported to the United States Public Health Service and checked for certain cities with reports to the Bureau of the Census. The figures are subject to correction from more accurate and complete reports.

TABLE 3.—*Variation in mortality rate from influenza and pneumonia (all forms) during six weeks of highest mortality among cities classified according to size.*¹

Population class.	Number of cities reporting.	Number of cities in which the mortality rate per 1,000 was—			
		Less than 2.	2-3.9	4-5.9	6 and over.
Under 25,000.....	23	2	5	9	7
25,000 to 50,000.....	23	1	11	2	9
50,000 to 75,000.....	16	1	11	2	2
75,000 to 100,000.....	4	2	1	1	0
100,000 to 125,000.....	10	0	2	5	3
Under 125,000.....	76	6	30	19	21
125,000 to 250,000.....	16	4	7	5	0
250,000 to 375,000.....	9	3	6	0	0
375,000 to 500,000.....	8	2	2	3	1
Under 500,000.....	109	15	45	27	22
500,000 to 1,000,000.....	6	1	2	2	1
1,000,000 and over.....	3	0	2	0	1

¹ As reported to the United States Public Health Service and checked for certain cities with reports to the Bureau of the Census. The figures are subject to correction from more accurate and complete reports.

TABLE 4.—*Variation in mortality rate from influenza and pneumonia (all forms) in 36 cities with populations of more than 100,000, classified according to size.*¹

Population class.	Number of cities whose mortality rate per 1,000 was—					
	1-1.9	2-2.9	3-3.9	4-4.9	5-5.9	6 and over.
Less than 250,000.....	1	2	2	4	5	0
250,000 to 500,000.....	4	5	1	2	3	1
500,000 to 1,000,000.....	1	1	0	0	1	0
1,000,000 and over.....	0	0	2	0	0	1

¹ Mortality rate during 10 weeks, from September 8 to November 16, inclusive, as published in the Weekly Health Index of the U. S. Bureau of the Census for November 19, 1918.

Mortality rates compared for localities classified according to the chronological order in which they were attacked by the epidemic.—In Table 5 the 118 localities have been classified according to the chronological order in which they appeared (from the indication afforded by an abnormally high death rate from influenza and pneumonias) to be affected by the epidemic.

The general tendency appears to be suggested that the mortality rate decreased as the epidemic spread. The same indication is afforded by the statistics of mortality from influenza and pneumonias for 10 weeks (Sept. 8 to Nov. 16, inclusive) in a smaller number of cities with populations of more than 100,000.¹

It is of interest to note in this connection that a similar suggestion is afforded in statistics of the epidemic in military camps in the

¹ Bureau of the Census: Weekly Health Index, November 19, 1918, Summary Table.

United States. The severity of the epidemic, as indicated by the case and mortality rate for pneumonia, declined as the epidemic spread among the camps, although the case rate for influenza increased.¹

This tendency probably accounts for the fact that the mortality rate from the epidemic in cities situated in areas later attacked is lower in most instances than in cities situated in areas attacked early in the course of the epidemic.

TABLE 5.—*Severity of influenza epidemic, as indicated by deaths from influenza and pneumonia (all forms) during six weeks of greatest mortality in cities classified according to the week in which the mortality rate first appeared to be abnormally high.*

Week in which mortality rate from influenza and pneumonia (all forms) first appeared to be abnormally high.	Number of cities reporting.	Combined populations.	Deaths in six weeks of highest mortality.	Mortality rate per 1,000 in six weeks of highest mortality.	Number of cities whose mortality rate per 1,000 in six weeks of greatest mortality was—			
					Under 2.	2-3.9	4-5.9	6 or more.
Sept. 14.....	3	990,373	5,130	5.2	0	0	2	1
Sept. 21.....	10	807,216	3,337	4.1	0	4	5	1
Sept. 28.....	23	9,302,457	41,747	4.5	3	6	7	7
Oct. 5.....	46	6,573,078	22,484	3.4	3	22	8	13
Oct. 12 or later.....	32	3,043,072	8,030	2.6	9	15	7	1

Course of the Epidemic According to Locality: Types of Curve.

It is significant that a variety of types of epidemic curves are indicated in the chronological data for cases and deaths. While it is not practicable at this time to present the graphs in detail, the fact that considerable variation in the curves (as well as in the total mortality from the epidemic) exists may be noted as demanding the most careful study from the point of view of the possible relation of such conditions as the occurrence of previous epidemics of similar or related diseases, type of locality, composition of population, method of epidemic control, chronological order of attack by the epidemic, and other possible factors.

Some relation of the length and of the course of the epidemic to the size of the locality, however, is suggested by preliminary data summarized in Table 6. The weekly mortality rate from influenza and all forms of pneumonia for corresponding weeks, beginning with the week in which the mortality rate from these causes appeared to be abnormally high, is shown for groups of localities classified according to size. The resulting rates, if plotted, would show a composite curve for each class of localities. Keeping in mind the fact that the total mortality rate from the epidemic (from September to

¹ Soper, George A., major, S. C., United States Army: The Pandemic in the Army Camps. Journal of the American Medical Association, Dec. 7, 1918 (71:1901).

November, inclusive) did not appear to bear any relation to the size of the city, it may be noted that—

(1) The epidemic appeared to be of a more “explosive” type in smaller cities than in larger ones. It should be stated, however, that this observation may be made only of the composite curve and that notable exceptions occur. Philadelphia, for example, had an epidemic of an explosive type in common with many smaller cities, while instances are not infrequent among small localities of epidemics distinctly slow in development. This wide variation in type as well as in total mortality among cities of similar size and often among cities of similar geographical location suggests the presence of other factors more fundamental.

(2) While the statistics do not cover the entire period of the epidemic (i. e., the “primary” epidemic alone) it is indicated that the epidemic was of longer duration in larger cities than in smaller ones.

In order to correlate total mortality with length of epidemic and type of curve, more complete data will be necessary than are now available.

TABLE 6.—*Number of deaths and death rate per 100,000 of population from influenza and pneumonia (all forms) for corresponding weeks after the beginning of the 1918 epidemic, compared for groups of cities of different size.*

Population class.	Number of cities reporting.	Combined populations of cities in each class.	Week of epidemic.						
			First.	Second.	Third.	Fourth.	Fifth.	Sixth.	Seventh.
			Number of deaths.						
Under 25,000.....	23	425,388	99	257	537	701	512	308	.....
25,000 to 50,000.....	18	678,158	92	347	671	948	763	418	.....
50,000 to 75,000.....	14	880,751	101	325	761	869	568	404	.....
75,000 to 100,000.....	4	339,621	22	224	308	166	115	83	.....
100,000 to 125,000.....	10	1,140,118	92	563	1,204	1,479	1,363	723	329
Under 125,000.....	69	3,474,036	406	1,716	3,481	4,163	3,321	1,936	.....
125,000 to 250,000.....	16	2,758,926	204	718	1,783	2,519	1,906	1,170	600
250,000 to 375,000.....	9	2,595,047	220	528	1,018	1,394	1,279	958	629
375,000 to 500,000.....	8	3,419,342	152	651	2,401	3,446	2,848	1,749	835
Under 500,000.....	102	12,237,351	982	3,613	8,683	11,522	9,354	5,813	.....
500,000 to 1,000,000.....	6	4,136,867	139	611	1,892	3,846	3,810	2,624	1,782
1,000,000 and over.....	3	9,573,931	273	1,304	4,417	8,823	9,625	7,874	5,515
			Death rate per 100,000 of population.						
Under 25,000.....	23	425,388	23.3	60.4	123.3	165.0	120.4	72.4	.....
25,000 to 50,000.....	18	678,158	13.6	51.2	98.9	139.8	112.6	61.6	.....
50,000 to 75,000.....	14	880,751	11.5	36.9	86.4	98.7	64.5	45.9	.....
75,000 to 100,000.....	4	339,621	6.5	66.0	90.7	48.9	33.9	24.4	.....
100,000 to 125,000.....	10	1,140,118	8.1	49.4	105.6	129.6	119.5	63.4	28.9
Under 125,000.....	69	3,464,036	11.7	49.5	100.5	120.2	95.9	55.9	.....
125,000 to 250,000.....	16	2,758,926	7.4	28.0	64.6	91.3	69.1	42.4	21.8
250,000 to 375,000.....	9	2,595,047	8.5	20.4	39.2	53.8	49.3	36.9	24.3
375,000 to 500,000.....	8	3,419,342	4.4	19.0	70.2	100.9	83.3	51.2	24.4
Under 500,000.....	102	12,237,351	8.0	29.5	70.9	94.1	76.4	47.5	.....
500,000 to 1,000,000.....	6	4,136,867	3.4	14.8	45.8	93.0	92.1	63.4	43.1
1,000,000 and over.....	3	9,573,931	2.9	13.6	46.1	92.2	100.5	82.3	57.6

The question of the length of the epidemic and the total mortality chargeable to it, as well as of the type of the epidemic curve, is involved in the occurrence of recrudescences of influenza or of an influenza-like disease which have made their appearance in many localities. It is as yet too early to form very definite ideas as to the relation of this reoccurrence or recrudescence to the epidemic of September, October, and November, but it would appear that those cities which had a high mortality rate during the primary epidemic are less likely, so far as the data at hand indicate, to be seriously affected by an immediate reoccurrence or recrudescence, and vice versa. For 37 cities of 100,000 population or more for which the Bureau of the Census has published mortality figures from influenza and pneumonia (all forms) for the period September 8 to December 14, inclusive, the following comparisons may be made.

(1) Of 23 cities whose mortality from influenza and pneumonia (all forms) during the 10 weeks prior to November 17, 1918, was 3.0 per 1,000 or more—

(a) Twelve cities had a mortality rate from the same causes of less than 0.5 per 1,000 during the period November 17 to December 14, inclusive, and

(b) All of the 23 cities had a mortality rate from the same causes of less than 1.0 per 1,000 during the period November 17 to December 14, inclusive.

(2) Of 14 cities whose mortality from influenza and pneumonia (all forms) during the 10 weeks prior to November 17, 1918, was less than 3.0 per 1,000—

(a) None had a mortality rate from the same causes of less than 0.5 per 1,000 during the period November 17 to December 14, inclusive, and

(b) Nine cities had a mortality rate from the same causes of 1.0 per 1,000 or more during the period November 17 to December 14, inclusive.

A similar observation may not be true in all instances, of course, of the case rate for influenza, since the mortality rate might be an indication merely of the severity of the recrudescence rather than of its occurrence. A less definite relation is actually indicated when similar comparisons are made for the case rates during the primary epidemic and during the recrudescence in certain cities and towns in cantonment zones.

Incidence According to Age.

The partial results of certain field studies undertaken in Baltimore are presented in Table 7, which shows the incidence of the disease according to age among the populations of a number of blocks selected at random.¹

Among a population of 16,797, it was found that the case incidence rate was nearly 250 per 1,000, and the mortality rate 4.4 per 1,000. It may be stated that the mortality rate among the population canvassed is somewhat lower than the rate for the entire city. It is indicated that about one in every four persons was attacked by the disease, and that of each 100 persons attacked nearly two died.

TABLE 7.—*Influenza incidence in Baltimore City, by age*¹—*Number of cases of influenza, number of deaths from influenza and pneumonia, and fatality rate, per 1,000, among population censused in various areas selected at random.*

Age group (years).	Num- ber of persons.	Cases.		Deaths.		Fatal- ity rate per 1,000 cases.
		Num- ber.	Rate per 1,000.	Num- ber.	Rate per 1,000.	
Under 5.....	1,655	416	251.4	13	7.9	31.3
5 to 9.....	1,528	554	362.6	3	2.0	5.4
10 to 14.....	1,447	479	331.0	4	2.8	8.4
15 to 19.....	1,533	451	294.1	7	4.6	15.5
20 to 24.....	1,576	413	262.1	8	5.1	19.4
25 to 29.....	1,489	461	309.6	15	10.1	32.5
30 to 34.....	1,450	400	275.7	9	6.2	22.5
35 to 39.....	1,277	280	219.3	3	2.4	10.7
40 to 44.....	1,120	216	192.8	3	2.7	13.9
45 to 49.....	952	152	159.7	1	1.1	6.6
50 to 54.....	891	105	117.9	2	2.2	19.1
55 to 59.....	570	70	122.8	1	1.8	14.3
60 to 64.....	528	64	121.2	0	.....	.....
65 to 69.....	351	47	133.9	4	11.4	85.1
70 to 74.....	223	19	85.1	1	4.5	52.6
75 and over.....	207	12	58.0	0	.....	.....
Total.....	16,797	4,139	246.2	74	4.4	17.9

¹ Cases and deaths were reported during the period July–November, 1918 (inclusive); population as censused by canvass in November and December, 1918.

The case fatality rate, when considered in relation to the case incidence rate, shows some interesting variations. It will be noted that the disease was quite prevalent among persons under 45 years of age, the incidence declining sharply in the older ages. The case fatality rate, on the other hand, was highest among children under 5 years of age and among adults of the ages 20 to 34 and 65 and over. Perhaps the most interesting observation, in view of the emphasis which has been placed on the apparent immunity among children of school age as indicated by the mortality rate is that children of the ages 5 to 14 were affected to a very great extent, although the fatality rate was relatively slight.

¹ These statistics embody only a portion of the results of the field studies made in Baltimore, as the data from these studies have not yet been completely tabulated. Certain field studies have also been undertaken in other localities and rural areas in Maryland as well as in several other States, but their results are not yet available.

**Chronological Relation of Onset of Influenza Cases to Onset of Pneumonia Cases
and to Mortality from Influenza and Pneumonia.**

The results of the field studies in Baltimore, so far as they have been tabulated at this writing, have been considered from the point of view of the chronological severity of the disease. In Table 8 is shown the number of cases of influenza, of "doubtful" cases of influenza, and of cases of pneumonia, and of deaths from influenza and all forms of pneumonia occurring in the areas canvassed, the cases and deaths being classified by weeks of their onset and occurrence. For convenience in comparison, the relative number of each has been computed for the period July 6–November 30, inclusive. By "doubtful" cases of influenza is meant those cases which confined the patient to bed less than three days; obviously these cases may include a number of cases which were not more than colds. The fact that the curve of "doubtful" cases follows the curves of influenza and pneumonia so closely, however, strengthens the presumption that they were, in the large majority of instances, influenza.

TABLE 8.—*Cases of influenza and pneumonia (including "doubtful" cases ¹) and deaths from influenza and pneumonia (all forms), by week of onset or occurrence, in 18 districts canvassed in Baltimore City.*

	Week ended—																				
	July—			August—				September—				October—				November—					
	13	20	27	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30
Cases:																					
Influenza.....	4	0	0	1	2	0	0	5	19	38	107	177	858	933	683	308	178	46	27	13	4
Pneumonia.....	0	0	0	0	0	0	0	0	6	2	7	19	77	67	37	18	13	7	3	3	1
Doubtful ¹	0	0	0	0	0	0	0	3	3	1	7	25	33	116	109	37	28	7	13	15	4
Deaths.....	0	0	0	0	0	0	0	0	0	0	1	1	4	27	20	11	6	1	3	1	0

RELATIVE NUMBER OF CASES AND DEATHS.

[Base: Arithmetic weekly average of cases and deaths from July 6 to Nov. 30, inclusive.]

Cases:	2	9	0	1	1	0	0	3	12	23	66	109	530	576	422	190	110	28	17	8	2
Influenza.....	2	0	0	1	1	0	0	3	12	23	66	109	530	576	422	190	110	28	17	8	2
Pneumonia.....	0	0	0	0	0	0	0	0	48	16	56	153	621	540	398	145	105	56	24	24	8
Doubtful ¹	0	0	0	0	0	0	0	14	14	5	32	114	412	527	495	168	127	32	59	68	18
Deaths.....	0	0	0	0	0	0	0	0	0	0	29	29	114	771	571	314	171	29	86	29	0

¹ By "doubtful" cases is meant cases causing disability of less than three days.

From this table it will be noted that there is a definite tendency for the disease to become milder as the epidemic spread. The peak of pneumonia cases occurred in advance of that of cases of influenza, while the tendency for the curve of "doubtful" or mild cases was to lag somewhat behind that of the influenza cases (i. e. cases of three or more days' disability). The deaths show a lag of two more weeks

behind the beginning of the epidemic and of about one week at their peak behind the peak of pneumonia cases. The tendency for the deaths to reach their peak very quickly and early in the epidemic is quite marked.

Variations in Incidence Among Areas in Baltimore.

Without attempting to correlate the results with any conditions, it may be of interest to point out that among the areas selected for canvass in Baltimore wide differences in the incidence of influenza were observed, showing that within a single city the rate may vary in a marked degree among different sections. For purposes of illustration, the data for a few of the areas canvassed are given below:

TABLE 10.—*Number of cases of influenza and rate per 1,000 of population during the period July 6–Nov. 30, 1918, inclusive, in certain areas canvassed in Baltimore City.*

Area No.	Population.	Number of cases of influenza.	Influenza rate per 1,000.	Area No.	Population.	Number of cases of influenza.	Influenza rate per 1,000.
15.....	948	452	477	24.....	1,000	185	185
12.....	947	365	385	7.....	1,312	213	162
13.....	1,115	385	345	9.....	1,013	157	155
2.....	1,740	504	290	14.....	665	99	135
3.....	830	200	241	11.....	994	61	67

Summary.

1. Because of the incomplete and inaccurate morbidity reports among the civil population, statistical studies of the influenza epidemic will be limited largely to mortality data. The principal morbidity data suitable for statistical analysis will be that available from field studies made in connection with population canvasses and from collections of reports from institutions and from selected population groups.

2. The collection of such material as are available from local and State health departments and registrars has been undertaken in cooperation with various State and Federal agencies. Field statistical studies have been begun in a number of representative localities. The material thus gathered will be made available for analysis by the various agencies concerned in the study of the epidemic.

3. A consideration of such statistical material as is at present available suggests the following tentative observations:

(a) A conservative estimate of the total mortality in the United States from the epidemic so far is that between 300,000 and 350,000 deaths have occurred.

(b) Definite radial movements of the epidemic from at least some population centers and from the northeastern section of the United States appear to be indicated. Preliminary reports, however, suggest

that centers of radial movements were established early in the epidemic in nearly all sections of the country and probably served as foci in its development.

(c) When the mortality rates for various localities are compared, no definite relation to the size of the locality is indicated. Considered chronologically, however, the severity of the epidemic appeared to decrease as the epidemic spread.

(d) The total mortality from the epidemic, however, can not be considered without reference to the occurrence of recrudesences that are now taking place. An inverse relation is suggested between the mortality rate during the primary epidemic and the recrudesence for a limited number of cities.

(e) The shape of the epidemic curve varies greatly for different cities, suggesting the importance of correlating the course of the epidemic in any city with such conditions as previous epidemics of respiratory or other diseases, methods employed in the attempt to control or mitigate the epidemic, or other conditions of possible significance. Considering composite curves for groups of cities classified according to size, it appears that the primary epidemic was of a more explosive type and shorter in duration in the smaller localities than in the larger cities.

(f) Results of field studies in Baltimore suggest that the case incidence of the disease was high in all ages up to 45, but that the fatality rate was extremely low in children of school age and relatively low among adults between the ages of 45 and 65.

(g) The field studies in Baltimore also suggest that the epidemic was milder in form in its later stages.

No attempt has been made to consider these preliminary data in relation to the various conditions that might affect the incidence and course of the disease. Studies of this character, it is hardly necessary to point out, must wait until the collection of more complete and accurate material now under way is completed.